14. (Twice Amended) An apparatus for processing a stereo pair of images, the apparatus comprising:

a memory which stores process steps; and

a processor which executes the process steps stored in the memory so as (i) to extract foreground from the stereo pair of images and (ii) to encode the foreground information at a first high level of quantization and to encode background at a second low level of quantization, wherein at least a majority of a bandwidth is encoded at the first quantization level, and

said encoder provides bit stream information for decoding of both the high level of quantization and lower level of quantization.

REMARKS

Reconsideration and withdrawal of all grounds of rejection are respectfully requested in light of the above amendments and the following remarks.

Claims 1, 4, 7, 8, 11 and 14 have been amended to clarify that the first high quantization level, which is used for foreground information, is quantized at first high rate relative to the second lower quantization level for background information. The instant claims recite that *the majority of the bandwidth* is encoded at the first high quantization level (specification at page 7, lines 9-13 provide support). Also, the claims have been updated to recite that the encoder provides bit stream information for decoding

of both the high level of quantization and lower level of quantization (specification, page 7, lines 9-12).

Summary of the Rejections:

(1) Claims 1-16 stand rejected under 35 U.S.C.§103(a) as allegedly being obvious over Stenger (of record DE 3608489A1) in view of Katata et al. of record (U.S. 5,815,601, hereafter "Katata") and Woodfill et al. (U.S. 6,215,898, hereafter "Woodfill").

(2) Claims 1-16 stand rejected under 35 U.S.C.§103(a) as allegedly being obvious over Stenger or record in view of Katata and Monro et al. (U.S. 6,078,619, hereafter "Monro").

Applicants' Traversal:

(1) It is respectfully submitted that none of the instant claims would have been obvious to a person of ordinary skill in the art over the combination of Stenger in view of Katata and Woodfill, at least for the reason that that combination of teachings fails to disclose or suggest the claimed feature that:

"an encoder coupled to the foreground extractor which encodes the foreground pixel information at a first high level of quantization and which encodes background pixel information at a second lower level of quantization relative to said first high level of quantization, wherein at least a majority of a bandwidth is encoded at the first high level of quantization."

It is admitted in the Office Action that the teachings of the references are combined because Stenger does not disclose: (a) a DCT block classifier coupled to the foreground extractor; (b) that the foreground pixel information is defined in terms of 8 x 8 blocks of DCT coefficients; and (c) that at least a majority of a bandwidth is encoded at the first quantization level (as recited in claims 1, 4, 7, 8, 11 and 14).

However, it is alleged that Katata discloses points (a) and (b) but does not disclose point (c). For this last point (c), it is alleged that Woodfill makes such a disclosure and the claimed invention allegedly would have been obvious to a person of ordinary skill in the art over the combination of teachings of the references.

Applicants have carefully reviewed all the references, and respectfully submit that Katata is silent with regard to how the majority of bandwidth is encoded. Accordingly, it is respectfully submitted that the combination of Stenger, Katata and Woodfill fails to disclose or suggest at least point (c) for the following reasons.

While it can be true that a finer quantization of a same-size area would require more bandwidth for transmission that a lower quantization of that same-size area, it is respectfully submitted that at the time of invention, a person of ordinary skill in the art would not have gleaned that the majority of bandwidth was being encoded for a first higher level quantization from the teachings of the combination of references. The drawing and passage of the specification cited in the Office Action are completely silent with regard to bandwidth.

Applicants respectfully submit that Woodfill, in combination with Stenger and Katata, still fails to disclose that a majority of bandwidth would be sent at a first quantization level, and said encoder provides bit stream information for decoding of both the high level of quantization and lower level of quantization. Woodfill teaches that the background information can be stripped from the scene, meaning that only the foreground information is sent during a transmission.

In contrast, the presently claimed invention sends both the higher level quantization data and the lower level quantization in each transmission, with the higher level quantization being assigned the majority of the bandwidth. The minority of the bandwidth is assigned to background information, but nonetheless still encodes and transmits both quantization levels on the same bandwidth. Applicants respectfully submit that this instantly claimed feature is patentably distinguishable from the combination of applied references, as the complete filtering of background, and later re-use of background transmission taught by Woodfill fails to overcome the prior art problems of a non-matching background relative to foreground. Applicants discuss this problem in the background of the invention section of this application. As the subjects in the foreground move, or lighting changes, a reused background is stagnant and will not provide the seamless encoding and decoding of frames proposed in the presently claimed invention.

Thus, it is respectfully submitted that the combination of references fails to disclose or suggest all of the instantly claimed features. Reconsideration and withdrawal of this ground of rejection are respectfully requested.

(2) With regard to the rejection of claims 1-16 under 35U.S.C.§103(a) over Stenger in view of Katata and in view of Monro, it is respectfully submitted that there is a lack of suggestion or motivation to combine the teachings of the references.

First, Monro teaches selective transmission of foreground information by transmitting only the foreground blocks that improve the image (column 2, lines 60-62).

Second, Monro discloses that in order to separate background information, two separate versions of the background information (an accepted background and a potential background) are constructed, and then compared. Each time the block matches the accepted background or potential background, it is labeled as such. This type of system is distinguishable from Katata and Stenger, and it is respectfully submitted that (1) there is no suggestion to combine the teachings of the reference; and (2) even if the references were to be combined, assuming *arguendo,* presently claimed invention would not be suggested to create an image processing device having a stereo pair of images and at least an encoder as claimed.

For all the foregoing reasons, it is respectfully submitted that all the present claims are patentable in view of the cited references. A Notice of Allowance is respectfully requested.

Respectfully submitted,

Dan Piotrowski
Registration No. 42,079

Date: April 9, 2003

By: Steve Cha
Attorney for Applicant
Registration No. 44,069

Mail all correspondence to:
Dan Piotrowski, Registration No. 42,079
US PHILIPS CORPORATION
580 White Plains Road
Tarrytown, NY 10591
Phone: (914) 333-9624
Fax: (914) 332-0615

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Steve Cha, Reg. No. 44,069
(Name of Registered Rep.)

4/9/03
(Signature and Date)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	Kiran Challapali et al.		
SERIAL NO.:	09/196,574	EXAMINER:	Richard J. Lee
FILED:	November 20, 1998	ART UNIT:	2613
FOR:	EXTRACTION OF FOREGROUND INFORMATION FOR VIDEO CONFERENCING		

Assistant Commissioner for Patents
Washington, DC 20231

MARKED VERSION SHOWING CHANGES MADE

Dear Sir:

In response to the Office Action dated January 29, 2003, please amend the application as follows:

IN THE CLAIMS:

1. (Three Times Amended) An image processing device, comprising:

an input which receives a stereo pair of images;

a foreground extractor coupled to the input which compares location of like pixel information in each image to determine which pixel information is foreground pixel information and which pixel information is background pixel information;

a DCT block classifier coupled to the foreground extractor which determines which DCT blocks of at least one of the images contain a threshold amount of foreground information; and

an encoder coupled to the DCT block classifier which encodes the DCT blocks having the threshold amount of foreground information with a first high level of quantization and which encodes the DCT blocks having less than the threshold amount of foreground information as background information at a second lower quantization level relative to said first high level of quantization, wherein at least a majority of a bandwidth is encoded at the first high quantization level, and said encoder provides bit stream information for decoding of both the high level of quantization and lower level of quantization that are encoded .

4. (Twice Amended) An image processing device, comprising:

an input which receives a stereo pair of images;

a foreground extractor which detects foreground pixel information from the stereo pair of images; and

an encoder coupled to the foreground extractor which encodes the foreground pixel information at a first high level of quantization and which encodes background pixel information at a second lower level of quantization relative to said first high level of quantization, wherein at least a majority of a bandwidth is encoded at the first high level of quantization,

wherein said encoder provides bit stream information for decoding of both the high level of quantization and lower level of quantization that are encoded.

7. (Twice Amended) An image processing system, comprising:

a stereo pair of cameras for taking a stereo pair of images;

a foreground extractor which detects foreground pixel information from the stereo pair of images; and

an encoder coupled to the foreground extractor which encodes the foreground pixel information at a first high level of quantization and which encodes background pixel information at a second lower level of quantization relative to said first high level of quantization; wherein at least a majority of a bandwidth is encoded at the first high quantization level, wherein said encoder provides bit stream information for decoding of both the high level of quantization and lower level of quantization that are encoded.

8. (Twice Amended) A method of encoding a stereo pair of images, comprising:

receiving the stereo pair of images;

extracting foreground information from the stereo pair of images; and

encoding the foreground information at a first [higher] high quantization level and encoding background information of the stereo pair of images at a second lower quantization level relative to said first high level of quantization; wherein at least a majority of a bandwidth is encoded at the first [higher] high quantization level, wherein said encoding step includes providing bit stream information for decoding of both the high level of quantization and lower level of quantization.

11. (Twice Amended) Computer-executable process steps to process image data from a stereo pair of images, the computer-executable process steps being stored on a computer-readable medium and comprising:

a foreground extracting step to detect foreground pixel information from the stereo pair of images; and

an encoding step for encoding foreground pixel information of at least one image at a first [higher] high quantization level and for encoding background pixel information of the at least one image at a second lower quantization relative to said first high level of quantization, wherein said encoding step provides bit stream information for decoding of both the high level of quantization and lower level of quantization;

wherein at least a majority of a bandwidth is encoded at the first high quantization level.

14. (Twice Amended) An apparatus for processing a stereo pair of images, the apparatus comprising:

a memory which stores process steps; and

a processor which executes the process steps stored in the memory so as (i) to extract foreground from the stereo pair of images and (ii) to encode the foreground information at a first high level of quantization and to encode background at a second low level of quantization, wherein at least a majority of a bandwidth is encoded at the first quantization level, and

said encoder provides bit stream information for decoding of both the high level of quantization and lower level of quantization.